Operational Assessment of Controller Complexity, Phase I

Completed Technology Project (2011 - 2011)

Project Introduction

In today's operations, acceptable levels of controller workload are maintained by assigning sector capacities based on simple aircraft count and a capacity threshold known as the monitor alert parameter (MAP). The MAP value of a sector is typically 5/3 of average sector flight time (or dwell time) measured in minutes, but may be adjusted up or down as necessary to account for other considerations such as sector geometry, traffic mix, and phase of flight. Future operations may utilize complexity as a proxy for workload instead. Our proposed research builds upon existing NASA complexity metrics by analyzing operational data to validate the factors that contribute to complexity in actual operations. We believe we have formulated a novel validation approach to apply to complexity. Our goal is to analyze a large sampling of operational data (substantially larger than could ever be provided by human-in-the-loop simulations) for a wide range of distinct sector types within Center airspace. This large and diverse sampling is anticipated to provide statistical significance to the validation of complexity factors. Most importantly, we believe that demonstrating sound operational validation of complexity is a key step in enabling the transition from aircraft count-based capacity to complexity-based capacity. The first objective is to develop a capability to analyze operational data that can identify sectors whose MAP value deviates from the 5/3 dwell time rule. These sectors will likely exhibit complexity that is higher or lower than the nominal complexity associated with a given MAP value. The next objective is to determine which complexity factors are positively or negatively influencing the sector capacity deviation from the 5/3 dwell time rule from the training set of operational sectors. The final objective is to validate that the complexity factors identified can accurately predict deviations from the 5/3 dwell time rule for the validation set of operational sectors.

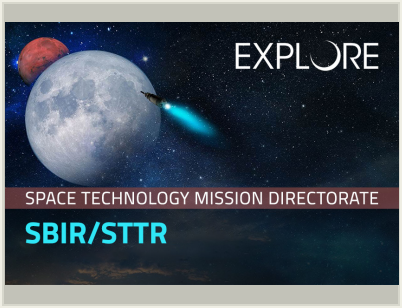

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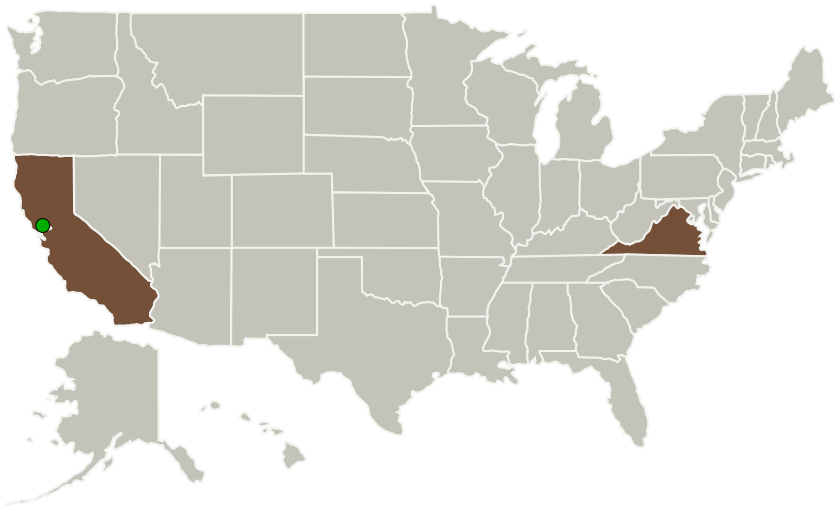
Table of Contents

Operational Assessment of Controller Complexity, Phase I

Completed Technology Project (2011 - 2011)

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Mosaic ATM, Inc.	Lead Organization	Industry	Leesburg, Virginia
Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations	
California	Virginia

Project Transitions

February 2011: Project Start

September 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138391)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Mosaic ATM, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

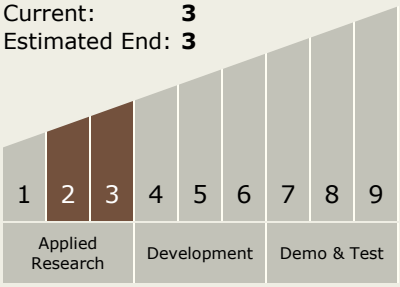
Carlos Torrez

Principal Investigator:

Ken Leiden

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX16 Air Traffic Management and Range Tracking Systems
  - TX16.3 Traffic Management Concepts

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System